AMENDMENTS TO THE CLAIMS:

If entered, this listing of claims will replace all prior versions and listings of claims in the application.

Listing of Claims:

1. (Currently Amended) A color imaging system providing on-the-fly color interpolation using analog signals to reconstruct colors during sensor readout, the imaging system comprising:

an array of pixel sensor elements wherein at east part of the array is arranged in rows and columns;

a color filter including a plurality of color filter components organized in a predefined pattern, the color filter overlaying at least a portion of the array;

a readout control circuit coupled to the array wherein the readout control circuit is configured to simultaneously read out values for a group of pixel elements within a first portion of the array, including at least two pixel elements from two different rows and two pixel elements from two different columns and to reconstruct color components for at least a first pixel sensor element and a second pixel sensor element using color information from

other pixels elements within at least the first portion of the array while the readout control circuit is reading said first portion of the array and wherein said readout control circuit comprises a pattern generator that is programmed by a digital command; and

a plurality of color amplifiers each corresponding to one of said color filter components wherein each said color amplifier has a programmable gain wherein said readout control circuit directly couples said pixel sensor elements to said color amplifiers.

2.(Canceled)

3.(Previously Presented) The system of Claim 1, wherein the readout control circuit is adapted to perform color interpolation using two pixel sensor elements read out in parallel.

4. - 28. (Canceled)

29. (Currently Amended) A method of interpolating color components of an array of pixel sensor elements, said method comprising:

reading a first rectangular portion of an array of

pixel sensor elements simultaneously, wherein the first rectangular portion includes pixel sensor elements from at least two array columns and two array rows;

reading a second rectangular portion of the array of pixel sensor elements, wherein the second portion partly overlaps said first portion and wherein said reading of said first and second rectangular portions is controlled by a pattern generator that is programmed by a digital command and wherein said readout control circuit directly couples said pixel sensor elements to a color amplifier; and

reconstructing color components using interpolation for at least a third portion of the array while said third portion of the array is being read wherein said array of pixel sensor elements comprises CMOS sensors.

30. (Canceled)

31. (Previously Presented) The method of Claim 29 wherein reconstructing color components using interpolation is performed in real-time.

32. - 37. (Canceled)

38. (Currently Amended) A color imager comprising:

a first light sensor which generates a first analog output signal related to the amount of a first color of light sensed;

a second light sensor which generates a second analog output signal related to the amount of a first color of light sensed;

a third light sensor which generates a third analog output signal related to the amount of a second color of light sensed;

a fourth light sensor which generates a fourth analog output signal related to the amount of a third color of light sensed;

a circuit configured to read out the first, second, third, and fourth analog values at the same time wherein said circuit comprises a pattern generator that is programmed by a digital command;

an interpolation circuit configured to receive said first output signal and said second output signal, wherein said interpolation circuit provides and interpolation signal on the fly based on at least said first analog output signal and said second analog output signal;

a summing amplifier to sum two or more said analog values; and

a plurality of color amplifiers each corresponding to one of said colors of light wherein each said color amplifier has a programmable gain wherein said readout control circuit directly couples said pixel sensor elements to said color amplifiers or to said summing amplifier.

39. - 42. (Canceled)

43. (Previously Presented) The system according to Claim 1 wherein said array of pixel sensor elements comprise CMOS sensors.

44. (Previously Presented) The system according to Claim 1 wherein said predefined pattern of color filter components comprises a Bayer pattern.

45. (Previously Presented) The system according to Claim 1 wherein said readout control circuit is programmed to selectively skip some of said groups of pixel elements to create a lower resolution said color reconstruction.

46. (Previously Presented) The method according to Claim 29 wherein a color filter including a plurality of color

filter components organized in a predefined pattern overlies at least a portion of the array and wherein said predefined pattern comprises a Bayer pattern.

47. (Previously Presented) The imager according to Claim 38 wherein said light sensors comprise CMOS sensors.

48. (Previously Presented) The imager according to Claim 38 wherein said said first, second, third, and fourth light sensors are arranged in a Bayer pattern.